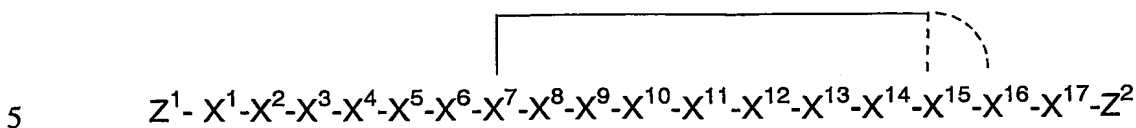


WHAT IS CLAIMED IS:

1. An optionally substituted peptide having the structure:



wherein X¹ is an optionally present amino acid that, if present, is either alanine, valine, leucine, isoleucine, proline, tryptophan, phenylalanine, methionine, glycine, serine, threonine, tyrosine, cysteine, asparagine, glutamine, lysine, arginine, histidine, aspartic acid, or glutamic acid, or a derivative thereof;

X² is an optionally present amino acid that, if present, is either alanine, valine, leucine, isoleucine, proline, tryptophan, phenylalanine, methionine, glycine, serine, threonine, tyrosine, cysteine, asparagine, glutamine, lysine, arginine, histidine, aspartic acid, or glutamic acid, or a derivative thereof;

15 X³ is an optionally present amino acid that, if present, is either alanine, valine, leucine, isoleucine, proline, tryptophan, phenylalanine, methionine, glycine, serine, threonine, tyrosine, cysteine, asparagine, glutamine, lysine, arginine, histidine, aspartic acid, or glutamic acid, or a derivative thereof;

20 X⁴ is an optionally present amino acid that, if present, is either alanine, valine, leucine, isoleucine, proline, tryptophan, phenylalanine, methionine, glycine, serine, threonine, tyrosine, cysteine, asparagine, glutamine, lysine, arginine, histidine, aspartic acid, glutamic acid, or norleucine, or a derivative thereof;

X⁵ is an optionally present amino acid that, if present, is either alanine, valine, leucine, isoleucine, proline, tryptophan, phenylalanine, methionine, glycine, serine, threonine, tyrosine, cysteine, asparagine, glutamine, lysine, arginine, histidine, aspartic acid, or glutamic acid, or a derivative thereof;

X⁶ is either a D-amino acid, 5-guanidinopropionic acid or its lower or higher homolog, or a derivative thereof;

X⁷ is either lysine, cysteine, homocysteine, 3-mercaptopropionic acid or its higher homolog, penicillamine, 2,3 diamino propionic acid or its higher homolog, or aspartic acid or its higher homolog, or a derivative thereof;

X⁸ is either methionine, norleucine, leucine, isoleucine, valine, methioninesulfoxide, or methioninesulfone, or a derivative thereof;

X⁹ is either leucine, isoleucine, valine, alanine, methionine, or 5-aminopentanoic acid, or a derivative thereof;

X¹⁰ is either asparagine, glutamine, alanine, leucine, isoleucine, valine, norleucine, cyclohexylalanine, phenylalanine, (2')-naphthylalanine, tyrosine, histidine, tryptophan, lysine, serine, threonine, methionine, or citrulline, or a derivative thereof;

X¹¹ is either arginine, lysine, citrulline, histidine, homoarginine, norarginine, or nitroarginine, or a derivative thereof;

X¹² is either valine, leucine, isoleucine, alanine, or methionine, or a derivative thereof;

X¹³ is either phenylalanine, tyrosine, D-(*p*-benzoylphenylalanine), tryptophan, (1')- and (2')-naphthylalanine, cyclohexylalanine, or mono and multi-substituted phenylalanine wherein each substituent is independently selected from the group consisting of O-alkyl, alkyl, OH, NO₂, NH₂, F, I, and Br; or a derivative thereof;

X¹⁴ is either arginine, lysine, histidine, norarginine, homoarginine, nitroarginine, or 5-aminopentanoic acid, or a derivative thereof;

X¹⁵ is either proline, alanine, valine, leucine, isoleucine, methionine, sarcosine, or 5-aminopentanoic acid, or a derivative thereof;

X¹⁶ is an optionally present amino acid that if present is either cysteine, homocysteine, cysteamine, penicillamine, 2,3 diamino propionic acid or its higher homolog, or aspartic acid or its higher homolog, or a derivative thereof;

X¹⁷ is an optionally present amino acid that, if present, is either alanine, valine, leucine, isoleucine, proline, tryptophan, phenylalanine, methionine, glycine, serine, threonine, tyrosine, cysteine, asparagine, glutamine, lysine, arginine, histidine, aspartic acid, or glutamic acid, or a derivative thereof;

Z¹ is an optionally present protecting group that, if present, is covalently joined to the N-terminal amino group;

Z² is an optionally present protecting group that, if present, is covalently joined to the C-terminal carboxy group;

provided that if X¹⁶ is present, X¹⁶ and X⁷ together form a cyclic group from 32 to 36 atoms joined by either a disulfide bond or an amide bond, wherein if X⁷ is either cysteine, homocysteine, 3-mercaptopropionic acid or its higher homolog, or penicillamine, then X¹⁶ is either cysteine, homocysteine, cysteamine, or

penicillamine; if X⁷ is 2,3 diamino proprionic acid or its higher homolog then X¹⁶ is aspartic acid or its higher homolog, and if X⁷ is aspartic acid or its higher homolog then X¹⁶ is 2,3 diamino proprionic acid or its higher homolog;

5 further provided that if X¹⁶ is not present, then X¹⁷ is not present, Z² is not present, X⁷ is lysine, and X¹⁵ and X⁷ together form a cyclic group joined by the X⁷ Lys epsilon amino group and the X¹⁵ carboxyl group;

or a labeled derivative of said peptide;

or a pharmaceutically acceptable salt of said peptide or of said labeled derivative.

10

2. The peptide of claim 1, wherein X⁶ is selected from the group consisting of: D-arginine, D- alanine, D-norleucine, D- α -aminobutyric acid, D-valine, D-leucine, D-isoleucine, D- proline, D-methionine, D- phenylalanine, D- asparagine, D-glutamine, D- serine, D-threonine, D- glutamic acid, D-aspartic acid, D- lysine, D-
15 histidine, D-tryptophan, D-tyrosine, D-cyclohexylalanine, D-(2')naphthylalanine, D-ornithine, D-homoarginine, D-nitroarginine, D-norarginine , D-citrulline and 5-guanidinopropionic acid.

3. The peptide of claim 2, wherein X¹⁰ is either asparagine or
20 glutamine.

4. The peptide of claim 3, wherein X¹, X², X³, X⁴, X⁵, X¹⁶ and X¹⁷ are not present.

25 5. The peptide of claim 3, wherein X¹⁶ is present.

6. The peptide of claim 5, wherein X¹, X², X³, X⁴, X⁵, are not present and X¹⁷ is either tyrosine or tryptophan.

30 7. The peptide of claim 5, wherein X¹, X², X³, X⁴, X⁵, and X¹⁷ are not present.

8. The peptide of claim 6, wherein Z¹ is either not present or is -C(O)CH₃ and Z² is either not present or is -NH₂.

9. The peptide of claim 7, wherein Z¹ is either not present or is -C(O)CH₃ and Z² is either not present or is -NH₂.

5 10. The peptide of claim 7, wherein
X⁸ is either methionine, norleucine, or N-methyl norleucine;
X⁹ is leucine;
X¹¹ is arginine;
X¹² is valine;
10 X¹³ is phenylalanine, (2')naphthylalanine, p-fluoro-phenylalanine,
tyrosine, or cyclohexylalanine;
X¹⁴ is arginine, or alanine;
X¹⁵ is either proline or sarcosine; and
X¹⁶ is either cysteine, D-cysteine, aspartic acid, or diamino proprionic
15 acid.

 11. The peptide of claim 10, wherein X⁶ is either D-arginine, D-
alanine, D-norleucine, D-proline, D-phenylalanine, D-asparagine, D-serine, D-
glutamic acid, D-lysine, or D-citrulline.
20

 12. The peptide of claim 11, wherein either X⁷ is 2,3 diamino
proprionic acid and X¹⁶ is aspartic acid; or X⁷ is aspartic acid and X¹⁶ is 2,3 diamino
proprionic acid.

25 13. The peptide of claim 12, wherein Z¹ is -C(O)CH₃ and Z² is
-NH₂.

 14. The peptide of claim 11, wherein X⁷ is cysteine and
X¹⁶ is cysteine or D-cysteine.
30

 15. The peptide of claim 14, wherein Z¹ is -C(O)CH₃ and Z² is
-NH₂.

 16. The peptide of claim 15, wherein X¹⁰ is glutamine.
35

17. The peptide of claim 1, wherein said peptide consists of a sequence selected from the group consisting of: SEQ ID NOs: 29, 30, 31, 32, 33, and 34.

5 18. The peptide of claim 17, wherein said peptide consists of SEQ ID NO: 30.

19. A method of screening for a compound able to bind MCH-1R comprising the step of measuring the ability of said compound to affect binding of the
10 peptide of any one of claims 1-18 to MCH-1R.

20. The method of claim 19, wherein said peptide is radiolabeled.

21. A method of selectively producing MCH-1R activity
15 comprising the step of providing a cell functionally expressing MCH-1R with the peptide of any one of claim 1-18.

22. The method of claim 21, wherein said MCH-1R has the amino acid sequence of SEQ ID NO: 35.
20

23. A method of screening for a MCH-1R antagonist comprising the steps of:

- 25 a) combining together a MCH-1R or a functional derivative thereof, a test compound, and the compound of any one of claims 1-18,
b) measuring the ability of said test compound to inhibit an MCH-1R activity as an indication of the ability of said test compound to act as said MCH-1R antagonist.

24. The method of claim 23, wherein said functional MCH-1R is a
30 mammalian MCH-1R.

25. The method of claim 23, wherein said functional MCH-1R is a human MCH-1R.

26. A method for increasing weight in a subject having an MCH-1R comprising the step of administering to said subject an effective amount of the peptide of any one of claims 1-18.

5 27. A method for increasing appetite in a subject having an MCH-1R comprising the step of administering to said subject an effective amount of the peptide of any one of claims 1-18.

10 28. A method for measuring the ability of a compound to decrease weight or appetite in a subject having an MCH-1R comprising the steps of:

- a) administering to said subject an effective amount of the peptide of any one of claims 1-18 to produce a weight increase or appetite increase,
- b) administering said compound to said subject, and
- c) measuring the change in weight or appetite of said subject.